A Re-Description of Ripersia corynephori Sign.

by

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Ripersia corynephori was described by SIGNORET in 1875 as a new species of Coccid which had been collected by his friend Mr PERRIS on the grass Corynephorus canescens. It is the type species of the genus *Ripersia*, but after PERRIS' discovery*) it has never been found again in France. This is a most unfortunate circumstance in view of the present confusion in the systematic literature of *Ripersia* and allied genera. In FERNALD's catalogue with supplements (1903—1915) 51 species of *Ripersia* are recorded. The names of 45 new species are mentioned in the Zoological Record 1915—1948, so that the present number of *Ripersia*-species described is about a 100. Of the allied genus *Trionymus* more than 60 species have been described.

SIGNORET's description of the new genus reads as follows :

"Genre *Ripersia* nobis. Nous avons créé ce genre pour les espèces de Dactylopites qui offrent six articles aux antennes pour la larve embryonnaire et pour la femelle arrivée à l'état adulte, la larve mâle conservant le nombre sept, le plus ordinaire dans tout le groupe. Les autres caractères sont ceux des *Dactylopius* ; cependant nous pouvons encore ajouter l'absence des digitules des tarses."

The only significant characteristic in this description is the 6-segmented antenna in the adult female. FERRIS (1918) states :

"..... no worse confusion than that at present displayed in the genus *Ripersia*. The real nature of this genus cannot be determined, for it was originally based simply upon the 6-segmented antennae of the adult female of the type species and this is practically the only significant fact that we possess in regard to this species. As at present understood the genus is made to include almost any species with 7-segmented antennae occurring on grass, roots or with ants. Even though the descriptions of practically every one of the North American species are hopelessly inadequate, it is obvious that the group thus obtained is a most heterogeneous assemblage and it is for all practical purposes meaningless."

MORRISON (1926) is of the same opinion : "The genus *Ripersia*..... is little more than a dumping ground for species of mealy bugs, having 6-segmented antennae and living on Gramineae, or on the roots of other plants or in ants' nests". Some authors have tried to re-define the genus *Ripersia* (GREEN 1926, KIRITSHENKO 1935, GOUX 1940), but as the genotype is not known such definitions must remain more or less arbitrary.

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*) E. PERRIS (1808—1878), who was a member of the "Société Entomologique de France" since 1838, did most of his collecting work around Mont-de-Marsan (Landes) where he was connected with the prefecture since 1836. (Cf. his biography in Ann. Soc. Ent. Fr. 1879, p.. 373—388). I suppose that *R. corynephori* Sign. was collected near Mont-de-Marsan like *Trionymus Perrisii* (Sign.) (SIGNORET, loc. cit., p. 337). The material from the Vienna Museum, mentioned hereafter, was labelled : Gallia meridion.

Ripersia corynephori Sign. has been reported from Germany by LINDINGER (1912), from Denmark by HENRIKSEN (1921/22), and from Bohemia by SULC (1912) as occurring on the roots of Corynephorus canescens (in ants' nests according to SULC and HENRIKSEN). It is not clear on what grounds these identifications have been made. LINDINGER and SULC have seen SIGNORET's collection of Coccidae which is at present in the Vienna Museum of Natural History, but according to SULC, SIGNORET's microscopical preparations were extremely poor and in many cases useless (Cf NEWSTEAD 1903, p. 93). LINDINGER (1912)*) considers *Ripersia Tomlini* Newstead (1892) as a synonym of *R. corynephori* Sign., but probably for no other reason than that both species have been found on Corynephorus canescens. NEWSTEAD (1903) and BALACHOWSKY (1932) are of opinion that *R. Tomlini* is a different species. After having examined SIGNORET's material of *R. corynephori* I have not the least doubt that it is different from *R. Tomlini* Newst. ; I am indebted to Dr A. BALACHOWSKY (Paris) for the loan of slides of *R. Tomlini* which have been compared by E. E. GREEN with NEWSTEAD's type slides. At least 2 other *Ripersia*-species (*R. formicarii* Newst. and *R. Mesnili* Balach.) are found on Corynephorus canescens**) so that it is not safe to identify a *Ripersia* as *corynephori* merely from its occurrence on this grass. By the courtesy of Dr S. L. TUXEN (Copenhagen) I could examine one of HENRIKSEN's specimens of *Ripersia corynephori*. Though the hairs and legs are missing it is evident from the circuli, cerarii, anal ring, antennae, and the quinquelocular pores around the rostrum, that this specimen belongs to *R. Mesnili* Balach. According to BORCHSENIUS (1949) *Ripersia corynephori* Sign. was also reported by KIRITSHENKO (1940) as found on the roots of Festuca in the Ukraine. BORCHSENIUS (loc. cit.) has redescribed this species as *Pseudococcus parvus* nov. spec. ; it is certainly different from the species examined in the present paper.

From what is said above it is clear that a re-description of the type species of *Ripersia* is very desirable. I am much obliged to the Director of the Vienna Museum for a small sample of this insect from SIGNORET's collection. This sample consisted of a minute piece of Corynephorus-leaf (measuring 1 × 12 mm) with some white waxy matter. The material had been preserved dry (probably for more than 70 years) in a small glass vial, labelled : "Gallia meridion. Auf Corynephorus canescens, *corynephori* det. Signoret." It

*) As was pointed out to me by Mr H. WÜNN, LINDINGER afterwards considered *R. corynephori* Sign. as a synonym of *Tychea graminis* Koch 1857 (Entom. Rundschau, 48, 1931, p. 79—80) and finally (1938) of *Coccus phalaridis* L. 1789. I am much obliged to Mr WÜNN, who had lost his material of *R. corynephori* Sign. (collected in the Nahe-valley and on the Hundsrück) during the past war, for some new specimens of *Ripersia*, but these proved to be *R. Mesnili* Balach., not yet reported from Germany. WÜNN has also reported *R. corynephori* from Baden (Zeitschr. f. angew. Entom., 11, 1925, p. 288) but apparently this material was also lost.

**) Collected by Mr D. HILLE RIS LAMBERS at Bennekom (Holland). Both species have been compared with type slides.

was only after this sample had been prepared and studied that I learned that it was all material available in the Vienna Museum. Apparently SIGNORET's microscopical preparation has been lost or spoiled.

From the material examined it is clear that *Ripersia corynephori* Sign. had been collected from the leaves of Corynephorus and not from the roots. The presence of a minute fragment of rootlet and about 15 sand-grains seem to indicate that the leaf-sample was taken from the foot of a Corynephorus-plant. In SIGNORET's description no mention is made of a subterranean habit nor of an association with ants.

In examining the white matter while dry (at a magnification of 50 ×) no insect-nature could be recognised. After soaking in water a larva or larval skin became partly visible, which according to the structure of its legs belonged to a Coccid. More details of it could be seen after warming the material during 4 hours in 50 per cent lactic acid*) at a temperature of about 80° C. On the main mass of the white matter, which contained (as appeared afterwards) an adult specimen, one Coccid-leg was all that could be recognised. It was only after warming twice again during 4 hours in lactic acid that the white matter had disappeared. After treating during one hour (at a temperature of 50—70° C) with phenolum liquefactum, saturated with chloralhydrate, the larvae were sufficiently cleared for examination but the adult female remained opaque as the body had been filled up with fungous filaments. All specimens were adhering firmly to the leaf or to the body of the adult insect so that they had to be separated by means of a camel's hair brush. The dorsal side of the adult female was covered by some sticky matter which was neither removed by a treatment with warm lactic acid during 16 hours nor by a treatment with warm KOH (¾ hour) or

*) Lactic acid is much less agressive and slower in its action on the soft parts of the insect-body than a 10 per cent solution of KOH which is commonly used in preparing small insects for microscopical study. Lactic acid does not make the chitin soft as KOH does, it seems not to act on the chitin at all. The history of this technique, which as far as I know has seldom been used abroad, is rather obscure. Dr J. G. BETREM informed me that he saw lactic acid used by herbalists to restore the natural form of flowers. Afterwards (about 1922) he was informed by Dr A. C. OUDEMANS that he used this reagens for fixing Acari as their mouthparts and legs were well stretched by this treatment. Dr BETREM used lactic acid himself to prepare small dried caterpillars for a study of their setal pattern. FRANSSEN, working on Aphids in the Entomological Laboratory at Wageningen (where Dr BETREM was assistant), was the first to publish this technique in his thesis (1927). Prof. Dr W. ROEPKE, his teacher, published the improved method, including the use of phenolchloralhydrate for final clearing (1928, 1929). Phenol-chloralhydrate (phenolum liquefactum saturated with chl. hydr.) was already used by VAN DER GOOT (1915) for preparing Aphids. The method can be recommended for insects with a delicate cuticle such as the Pseudococcinae and Aphids, especially in the case of old dry material, and in all other cases where damage by KOH-treatment is to be feared. As after 16 hours treatment with warm lactic acid the adult female of *R. corynephori* was not yet cleared, I have finally applied a warm solution of 10% KOH during 45 minutes. After this treatment the chitin had lost its coherence so that the specimen broke into fragments when a coverglass was laid upon it.

carbol-xylol (16 hours). Some sand- and pollengrains and one first-stage larva were still adhering to the body after all these manipulations.

In total 5 first-stage larvae have been isolated, of which 2 were in good condition, further one second-stage larva (head damaged, body wrinkled but well cleared) and one adult female (body wrinkled and distorted, filled up with fungous filaments). During each step of the above-mentioned treatment new details that became visible were studied and drawn.

First stage larva (fig. 1)

Dimensions of two specimens (in micr. preparation) 0.42 × 0.16 and 0.44 × 0.18 mm.

Antennae 6-segmented (fig. 2), length 0.12—0.13 mm. The basal segment is provided with 4 hairs (3 larger ones and one much smaller), the second segment with 3 hairs and the usual "sensorium" near its top, the third, fourth and fifth segment each with a whorl of 5 hairs. A thick, bluntly pointed, more or less curved, "sensory" hair is found near the top of the fifth segment (in addition to 5 ordinary hairs). On the sixth or terminal segment 2 whorls of 5 hairs are present besides a group of hairs at the top. This apical group contains 6—7 ordinary hairs and 3 "sensory" setae of the same type as the above-mentioned. An additional "sensory" hair is found just above the lower whorl of ordinary hairs. These 5 "sensory" setae on the two last segments are recognisable in nearly all Pseudococcinae. Among the 6—7 ordinary hairs in the apical group two are shorter and more spine-like than the others.

Legs. Fore-legs 0.16—0.17 mm (fig. 3 and 34). Tarsus slightly larger than tibia, with 13 hairs and 2 unknobbed digitules. The claw has a faint denticle on the inner side and 2 slightly knobbed digitules which are little longer than the claw itself (fig. 4). The tibia is provided with 9 hairs ; those at the inner angle of the distal end are scarcely thicker than the rest. The femur is provided with 8 hairs. The trochanter has 4 hairs (one very long) and the 4 usual sensoria which are probably present in all Pseudococcinae. Coxa with 5 hairs. The median and posterior legs are of the same structure (fig. 35).

Mouthparts. The rostral loop (fig. 1) reaches till halfway between middle and hind legs. The labium (fig. 5) is bipartite and shaped like an equilateral triangle ; the basal part is about 2½—3 times as broad as long. On the ventral side of the labium one pair of hairs is seen on the basal part and 7 pairs on the apical part (fig. 31). There are 2 pairs of hairs on the dorsal side of the apical part. Near the basal angles of the labium are 2 small sclerites, each with a group of 3 hairs. The same condition was found in several other Pseudococcinae.

Cuticle, dorsal side. The posterior ostioles and the eyes (fig. 6) are clearly visible, the anterior ostioles only obscurely.

The dorsum is covered with short spine-like hairs which are arranged in regular rows on the abdomen (fig. 10). These hairs are

probably common hairs and not glandular spines as the lanceolate spines on the dorsum of *Ripersia Mesnili* Balach. and *Phenacoccus*-species which secrete wax. Trilocular pores are sparingly scattered over the whole dorsum and associated with the hairs (fig. 10). Cerarii are little developed. There is no concentration of trilocular pores and there are no special cerarian spines. Some 15—17 pairs of hairs, similar to the dorsal setae, are seen at the lateral side of the body and considered to represent the cerarian spines (figs. 7 and 10). The anal ring (fig. 7) shows one external row of pores, rather wide apart and of irregular position ; an interior row is only indicated by one or more isolated pores.

Cuticle, ventral side. The hairs on the abdomen are arranged in regular rows and about twice as long as on the dorsal side (fig. 10). At the posterior end or the body there are 2 long apical hairs which are about thrice as long as the hairs of the anal ring (fig. 7); the anal lobes are obsolete.

No trilocular pores are found on the ventral side. There are, however, 14 pairs of quinquelocular pores, 7 pairs on the abdomen, 5 pairs on the thorax (3 pairs near the bases of the legs and 2 pairs near the spiracles), and 2 pairs on the head (figs. 8, 9 and 10). The diameter of these pores is about 5 μ. On the abdomen the quinquelocular pores are associated with the transversal rows of hairs (fig. 10) as is the case with the trilocular pores on the dorsal side.

A circulus, as described by SIGNORET for the second abdominal suture of the larva ("sur la seconde suture abdominale une cicatrice oblongue"), was not found.

SIGNORET gives no figure of the larva. His description reads as follows :

"..... les individus à l'état de larve, qui présentent comme elle (the adult female. *R.*) des antennes de six articles dont le sixième plus long que les trois précédents et dont le tarse est franchement plus grand que le tibia. Nous n'avons pas pu voir également de digitules aux tarses ; quant à ceux du crochet, ils sont plus visibles que dans l'adulte. Le corps présente des poils assez longs, mêlés de filières en forme de ponctuation arrondie. Le menton est à peine plus long que large, avec les filets rostraux courts, l'anse atteignant au plus les pattes intermédiaires. Sur la seconde suture abdominale une cicatrice oblongue, et sur la cinquième deux autres (posterior ostioles. *R.*), une de chaque côté ; au-dessus des yeux nous avons encore remarqué une impression que nous avons peu remarquée en général (anterior ostioles ? *R.*)."

Second stage larva (fig. 11)

Dimensions of body in microscopical preparation (abdomen shrunk) 0.56 × 0.26 mm, antenna 0.18 mm, fore-leg 0.22 mm. These dimensions are about 50 per cent larger than those of the first stage larva. The structure of the antennae, legs (figs. 33 and 36), mouthparts (fig. 30), and the posterior end of the body (fig. 12) is the same as in the-first stage larva. A faint denticle is present on the claw of all legs. Tarsus and tibia are about of the same length.

The following differences were noticed. Trilocular pores are more abundant and irregularly scattered. The quinquelocular pores

on the ventral side of the abdomen have all disappeared and (as far as could be ascertained) also on the thorax and the head. Besides trilocular pores only one multilocular pore and 6—7 tubular glands could be found on the ventral side of the abdomen near the posterior end (fig. 12).

Eyes, ostioles and cerarii (except the posterior ones) were not visible in this damaged specimen. There is no marked concentration of trilocular pores near the posterior cerarian spines which are similar to the dorsal hairs (figs. 12 and 29).

The second stage larva is not mentioned in SIGNORET's description.

Adult female (fig. 13)

Dimensions of body (in microscopical preparation) about 2 × 1 mm, antennae 0.18 mm, fore-leg 0.28 mm.

Antennae 8-segmented (figs. 14 and 15). The apical segment has been divided in two as is clear from the position of the "sensory" hairs, compared with those in the larval antenna. In the antenna of the larva there are two segments between the second (recognisable by a "sensorium") and the fifth (with a single "sensory" hair near its top). In the adult female 3 segments are present between the two mentioned above. Probably the third segment in the larva has been divided in two, as two whorls of hairs are present on this segment in the second larval stage; further it is $1\frac{1}{2}$ × as long as in the adult female.

In the *legs* (figs. 16—19 and 32) the tibia is slightly longer than the tarsus while in the first stage larva the reverse is the case. All legs have a faint denticle on the claw like the first and second stage larva (fig. 19).

Mouthparts. The labium (fig. 25) has the same shape as in the larval stages but its size is somewhat larger. The hairs on the labium are the same as in the first stage larva; 18 hairs were counted on the apical segment, 4 of these probably belonged to the dorsal side. The mouth-setae are short. The rostral loop probably reaches only as far as the middle legs (fig. 13).

Cuticle, dorsal side. The dorsal side was covered by a sticky mass to which many pollen grains of Pinus silvestris and sand grains were adhering. This sticky mass and the fungous filaments inside the body did not allow to make a well-cleared preparation.

The dorsal side is provided with scattered trilocular pores and small hairs or spines without any regular arrangement (figs. 20 and 24). Seven multilocular glandpores, arranged pairwise, could be observed on the medio-dorsal part of the posterior abdominal segments (fig. 20). The posterior ostioles were visible but the cerarii (2 posterior pairs) only obscurely as the body was distorted and covered by dirt which could not be removed. It is, however, pretty certain that the posterior cerarian spines are like the dorsal hairs (which is also the case in the larval stages) and that there is no appreciable concentration of trilocular pores in the cerarii (figs. 21 and 22). The anal lobes are obsolete, eyes are present (fig. 27).

All these features correspond with those of the larvae. The apical hairs on the anal lobes were missing; judging from their place of insertion (figs. 21—22) they are probably larger than the anal hairs as is the case in the larvae; in SIGNORET's figure of the adult female they are at least twice as long as the anal hairs. The anal ring contains 6 hairs and 2 rather irregular rows of pores of which one is only faintly indicated (fig. 26); the same is the case in the larval stages (figs. 7 and 12).

Cuticle, ventral side. Trilocular pores are sporadically scattered over the whole ventral side. Quinquelocular pores were not observed and are probably absent; these pores are only visible in well-cleared preparations. There are several multilocular pores, with a diameter of about 8 μ and 10 loculi, on the posterior abdominal segments. These pores are most numerous around the genital fissure (figs. 23 and 24). Tubular glands are probably present on the posterior end of the body (fig. 22) but their visibility was obscured by the presence of fungous threads.

The hairs are longer than those on the dorsal side (fig. 24). The posterior spiracle is somewhat larger than the anterior one (fig. 28). A circulus (ventrolabium) was not observed.

Apparently the specimen examined was a young adult female. It seems to correspond with SIGNORET's "larve mâle" which has 7- or 8-segmented antennae ("les antennes de sept articles, le dernier article même paraissant ici être formé de deux"). It is quite certain that SIGNORET was mistaken in describing this stage as a male larva. He gives a small figure of it in which the rostral loop of the mouthsetae is shown and a transverse fissure, probably the female genital aperture, placed one segment behind the posterior ostioles. Apparently SIGNORET thought that the genital products were discharged through the anus; he speaks of an "anneau génito-anal". SIGNORET's male larva is more than 1.5 mm long, and its tibia is longer than its tarsus; this also points to an adult and not to a larva. I suppose that SIGNORET has taken a young adult female of *Ripersia corynephori* for a male larva. Mature females of *Ripersia* have their body distended after the development of the eggs, so that they may become almost unrecognisable. In *R. Mesnili* Balach. e.g. I found all dimensions enlarged about 3 times (the volume about 30 times) after maturation. The structure of the cuticle is obscured by this distension so that it is preferable to base new descriptions, if possible, on young adults which are not disfigured by the development of the eggs.

SIGNORET's description of the "male larva" of *Ripersia corynephori* reads as follows:

"La larve mâle (fig. 1a) présente sept articles aux antennes; elle est plus petite que la femelle, dépasse à peine 1 millimètre ½; les tibias sont plus longs que le tarse; tels sont les caractères qui nous sont toujours paru devoir appartenir au mâle, en dehors de preuve plus convaincante, telle que le pénis; les antennes de sept articles, le dernier article même paraissant ici être formé de deux, le sixième et le cinquième plus courts, les autres prèsque égaux; le menton est aussi plus large que long, les filets rostraux très-courts; sur l'abdomen les poils et les cicatrices de la larve femelle jeune. Nous ne connaissons pas le mâle à l'état parfait".

Summary and discussion

From a sample of Coccids, received from the Vienna Museum of Natural History, and identified by SIGNORET himself as *Ripersia corynephori* Sign., two larval stages and an adult female were isolated which resemble each other closely in structure of the antennae, legs, mouth-parts, cerarii and anal ring so that there can be little doubt that they belong to one single species. In all stages examined there is a faint denticle on the claw of all legs. No appreciable concentration of pores is seen in the cerarii which are only recognisable by the paired character of the cerarian spines which have about the same shape as the dorsal hairs. At least 15 pairs of these cerarian spines were observed in the first stage larva. In this stage 14 pairs of quinquelocular pores are found on the ventral side of the body while the dorsal side is provided with trilocular pores; the position of both kinds of pores on the abdomen is clearly associated with that of the hairs. Tubular glands are present in the second stage larva and probably also in the adult female. Multilocular pores are found on the ventral side of the abdomen, around the genital aperture, in the adult female; also a few (7) were observed on the medio-dorsal side of the posterior abdominal segments. In the second stage larva one single multilocular pore was found on the ventral side near the end of the abdomen. Quinquelocular pores were not observed in the second stage larva and the adult female; trilocular pores are present in all stages. The areolation of the anal ring is faintly developed in all stages and contains two rows of scattered pores.

Both larval stages have 6-segmented antennae. In the adult female — at least in the specimen examined — the antennae are 8-segmented. From the position of the "sensory" hairs it is clear that the apical segment of the larval antenna has been divided in two parts in the adult female as is also the case in *Phenacoccus*-species with 9-segmented antennae. It seems likely that this division can be obliterated and that specimens with 7-segmented antennae occur. NEWSTEAD (1892) figures the apical segment of the antenna of *Ripersia Tomlini* Newst. as composed of two parts, but states that the articulation is very faint, and that it looks like a fused segment. SIGNORET's new genus of *Ripersia* was characterised by 6-segmented antennae, but afterwards several species of *Ripersia* have been described in which the number of antennal segments varies between 6 and 7.

The material examined answers well to the re-definitions of *Ripersia* given by GREEN (1926), KIRITSHENKO (1935) and GOUX (1940), viz. antennae 5—7 segmented (generally 6), only the posterior cerarii developed (usually 1—2), cerarian spines hair-like, few multilocular glands present (generally on the posterior segments only. *R.*), short swollen legs, tibia about equal and as long as the tarsus, anal ring of the beaded type as in *Pseudococcus* with two rows of pores, denticle on claw absent or faintly developed (GOUX), quinquelocular pores present in some species (GOUX).

The most peculiar characters in the material examined seem to be

the presence of a denticle on the claw in all stages and the presence of quinquelocular pores in the first stage larva (as indicated in fig. 8). In the Pseudococcinae a denticle on the claw is often accompanied by quinquelocular pores on the ventral side of the body, especially in the larvae (*Phenacoccus, Heterococcus, Rhodania, Pseudococcus calluneti* Ldgr., *Ripersia Mesnili* Balach., *R. exul* Green, *R. montana* Newst., *Euripersia amnicola* Borchs.). Some *Ripersia*-species possess quinquelocular pores e.g. *R. hypogea* Leon., *R.* (*Brevennia*) *tetraspora* Goux and *R.* (*Lacombia*) *Bouhelieri* Goux. I found them abundantly in the larvae of *R. Mesnili* Balach. In the first stage larva 42—43 of these pores were counted on the ventral side of the body and in the second stage larva even 103 ; they are also present in the adult female around the rostrum (about 10—17). *R. Mesnili* differs, however, from the species examined by the possession of 2—3 pairs of lanceolate cerarian spines in all stages and other features. The first stage larvae of *R. exul* Green have about 80 quinquelocular pores on the venter ; the dorsal side is also covered with this type of pores*) ; very few trilocular pores are present, viz. on the rim of the ostioles. I am indebted to Mr F. LAING of the British Museum for the loan of slides of *R. exul* and of an ovisac from which the larvae were prepared ; the adult female is very similar to *R. Mesnili* Balach., but it has usually 3 small circuli instead of 2.

As was stated above the Vienna species is certainly different from *R. Tomlini* Newst. It does not correspond with any description of *Ripersia* that I have seen, but very few accurate descriptions of *Ripersia*-larvae are available. A denticle on the claw is found in some European *Ripersia*-species. I have examined a specimen from Switzerland (not identified), *R. Mesnili* and *R. exul*, which have such a denticle but none of these conforms with the *corynephori* from the Vienna Museum.

Euripersia amnicola. Borchs., the type species of the new genus *Euripersia* Borchsenius (1948), is certainly different from the *Ripersia* of the present paper, though it has a denticle on the claw and quinquelocular pores on the ventral side of the first stage larva (Cf. BORCHSENIUS 1949). The anal ring in the examined specimens of *Ripersia corynephori* Sign. is remarkable for its sparse and faint areolation in contrast to *R. Mesnili* Balach., *R. exul* Green, *R. Tomlini* Newst. and *R. formicarii* Newst.

As SIGNORET's type with 6-segmented antennae was not represented in the material from the Vienna Museum, it remains a question whether the adult female which I have examined is identical with SIGNORET's *R. corynephori*. It would be possible that he has confounded two species on the same foodplant. I regret that

*) As was found afterwards, this is also the case in the larvae of *R. Mesnili* Balach. which are born in Aug. and Sept. (Hilversum 20/8/'49 ; Bennekom 20/8/'50 ; Epen, end of Aug. 1950 ; Rudolfshaus, Germany, 3/9/'50). *R. exul* Green is perhaps an insular form of the continental *R. Mesnili* Balach. *R. Mesnili* is at present known from Corsica, Germany, Holland and Denmark, *R. exul* from Guernsey and England.

the microscopical preparation on which SIGNORET based his description is not available. Even if it were in a poor condition, it would probably be possible to compare the antennae and claws with the species at hand.

SIGNORET's description of the adult female of *R. corynephori* is very short.

"d'un jaune clair, couvert d'une ponctuation farineuse et blanchâtre, et d'une longueur de 2 à 3 millim. sur 1 à 1¼ de large. Antennes de six articles, dont le sixième le plus long et plus grand que les deux précédents ; le second est moins grand que le sixième et presque égal au quatrième et cinquième, qui sont les plus petits. Les jambes, dont les cuisses sont fortes, présentent un tibia un peu plus grand que le tarse, celui-ci offrant une pubescence rare et courte, le crochet, fort à la base et en arc, avec deux très-courtes digitules à peine visibles. Nous ne pouvons voir de digitules aux tarses. Le menton est large, à peine plus long que large. L'abdomen est pubescent vers le sommet, avec les poils et les filières ordinaires et l'anneau génito-anal avec six poils."

SIGNORET gives only a very small figure of the dorsal side of the adult female without details. No hairs are drawn on the dorsum. He observed eggs within the body from which he derived that his specimen was certainly an adult female. This short description could apply to our adult female except for the 6-segmented antennae and the "ponctuation farineuse". My specimen was rather thickly covered by a coating of waxy material on the dorsal side and a sticky mass of I do not know what matter.

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Explanation of figures.

1—10. *First stage larva.*

1. Seen from the ventral side. 100 ×.
2. Left antenna. 500 ×.
3. Fore leg. 500 ×. See also fig. 34.
4. Claw. 1000 ×.
5. Labium. 500 ×. For complete setal pattern see fig. 31.
6. Eye. 500 ×.
7. Apex of abdomen, ventral side. 500 ×.
8. Position of quinquelocular pores on the venter. 225 ×.
9. Quinquelocular pore. 675 ×.
10. Position of hairs and gland pores. The abdomen is seen from the lateral side, the anterior end of the body more from the dorsal side. The dotted line indicates the position of the paired hairs (cerarian spines) at the side of the body. Only the basal part of the apical seta on the abdomen is drawn. 400 ×.

11—12. *Second stage larva.* (See also figs. 29, 30, 33 and 36).

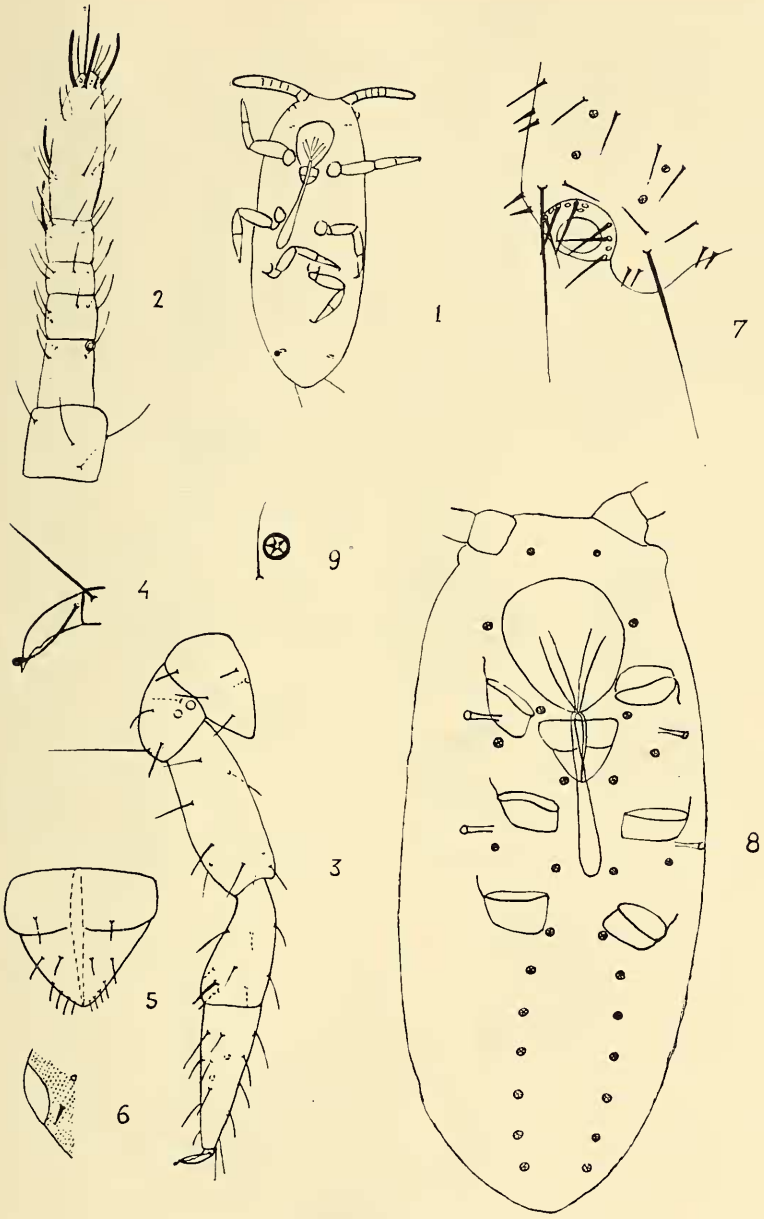
11. Seen from the ventral side. 100 ×.
12. Posterior end of abdomen, ventral side: *t* = tubular gland. 500 ×.

13—28. *Adult female.*

13. Seen from the ventral side. At the extremity of the body: anus, genital fissure and multilocular glands. 50 ×.
14. Left antenna; basal joint seen in the direction of its axis. 500 ×.
15. Right antenna, 3 apical joints. 500 ×.
16. Fore leg. 225 ×. See also fig. 32.
17. Middle leg. 225 ×.
18. Hind leg. 225 ×.
19. Claw. 500 ×.
20. Posterior end of abdomen, seen from the dorsal side, on which 7 multilocular glands are visible. 225 ×.
21—22. Posterior cerarii (*c* = base of cerarian spines. *t* = base of the apical hairs on the anal lobes). In fig. 22 two tubular glands are separately drawn. 500 ×.
23. Multilocular glands around the genital fissure. 500 ×.
24. Multilocular and trilocular gland pore; dorsal hair (short) and ventral hair (longer). 1000 ×.
25. Labium, seen from the dorsal side. Position of hairs; those on the ventral side indicated by a broken line. 750 ×.
26. Anal ring. 1000 ×.
27. Eye and base of antenna. 500 ×.
28. Anterior (*a.s.*) and posterior spiracle (*p.s.*). 500 ×.

29—36. *Additional figures.*

29. Second stage larva. Posterior cerarian spines. Apical hair on anal lobe. One of the anal hairs (bottom side). 750 ×.
30. Second stage larva. Labium seen from the ventral side. Position of hairs (those on the dorsal side indicated by a broken line). 750 ×.
31. First stage larva. Labium seen from the dorsal side. Position of hairs (those on the ventral side indicated by a broken line). 750 ×.
32. Fore leg of the adult female. The hairs on tibia and tarsus, which were covered by adhering dirt, are only partly indicated. 500 ×.
33. Fore leg of second stage larva. 500 ×.
34. Fore leg of first stage larva. 500 ×.
35. Hind leg of first stage larva. 500 ×.
36. Hind leg of second stage larva. 500 ×.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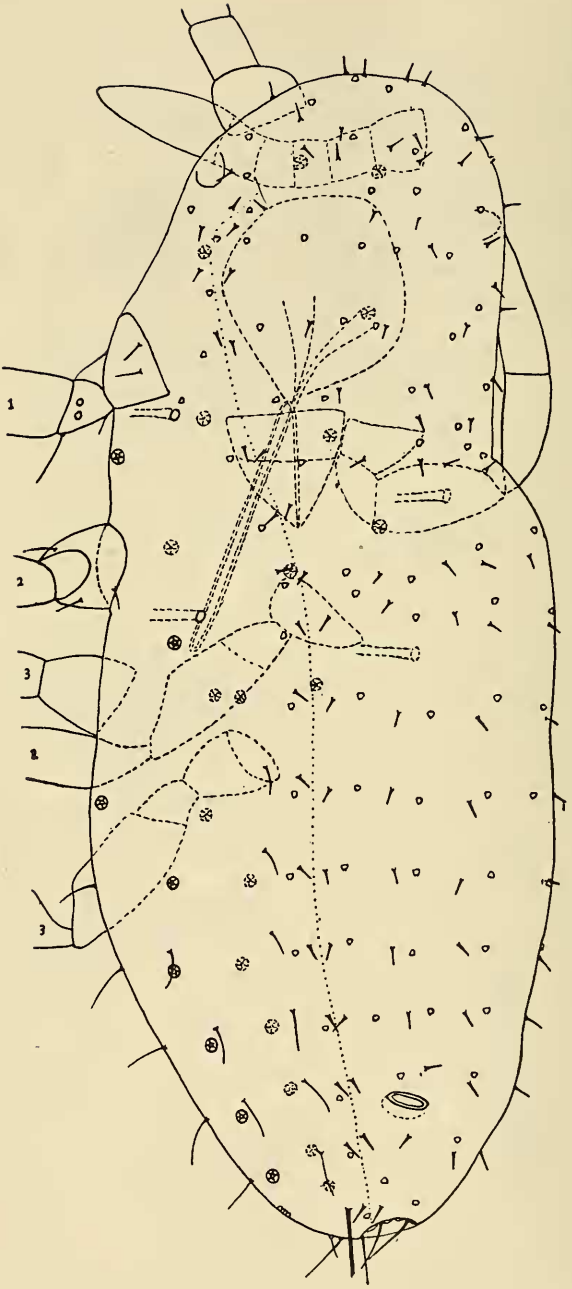

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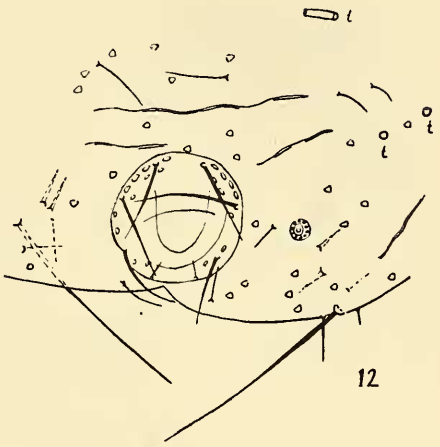

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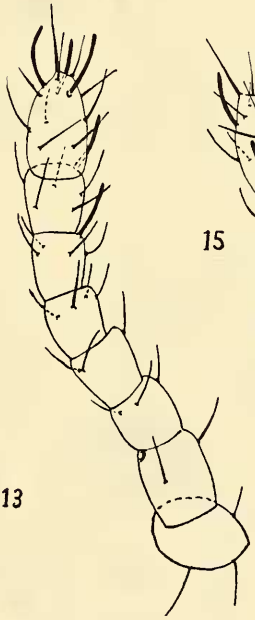

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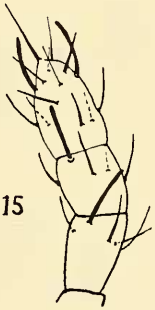

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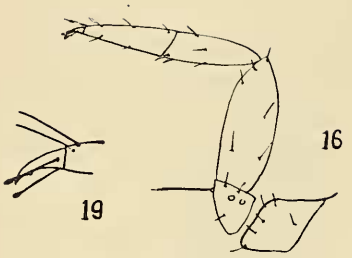
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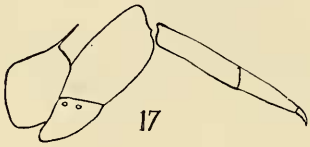
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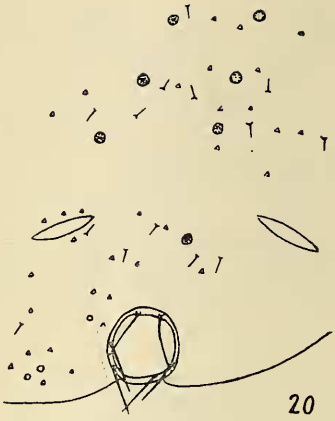
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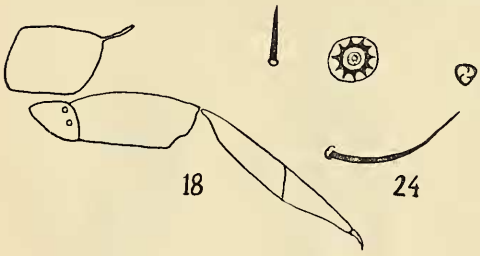
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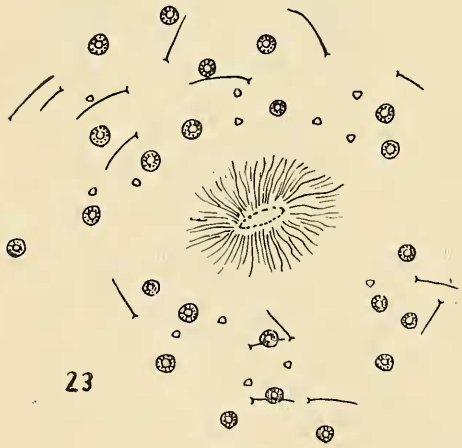
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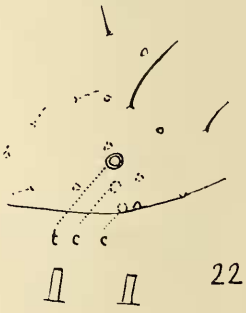
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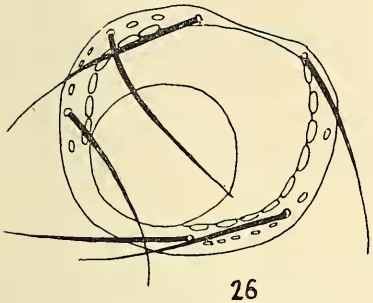

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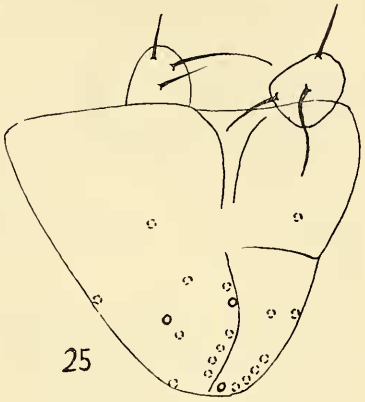

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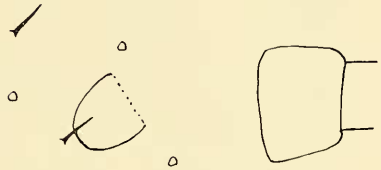

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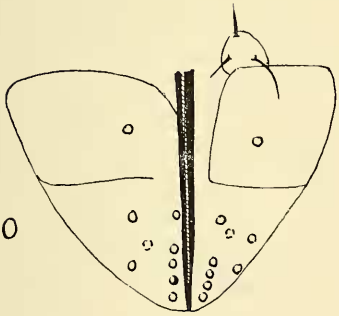

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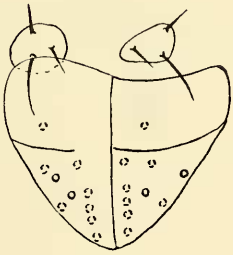

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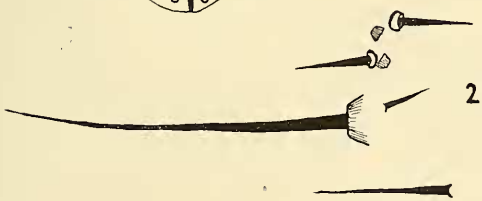

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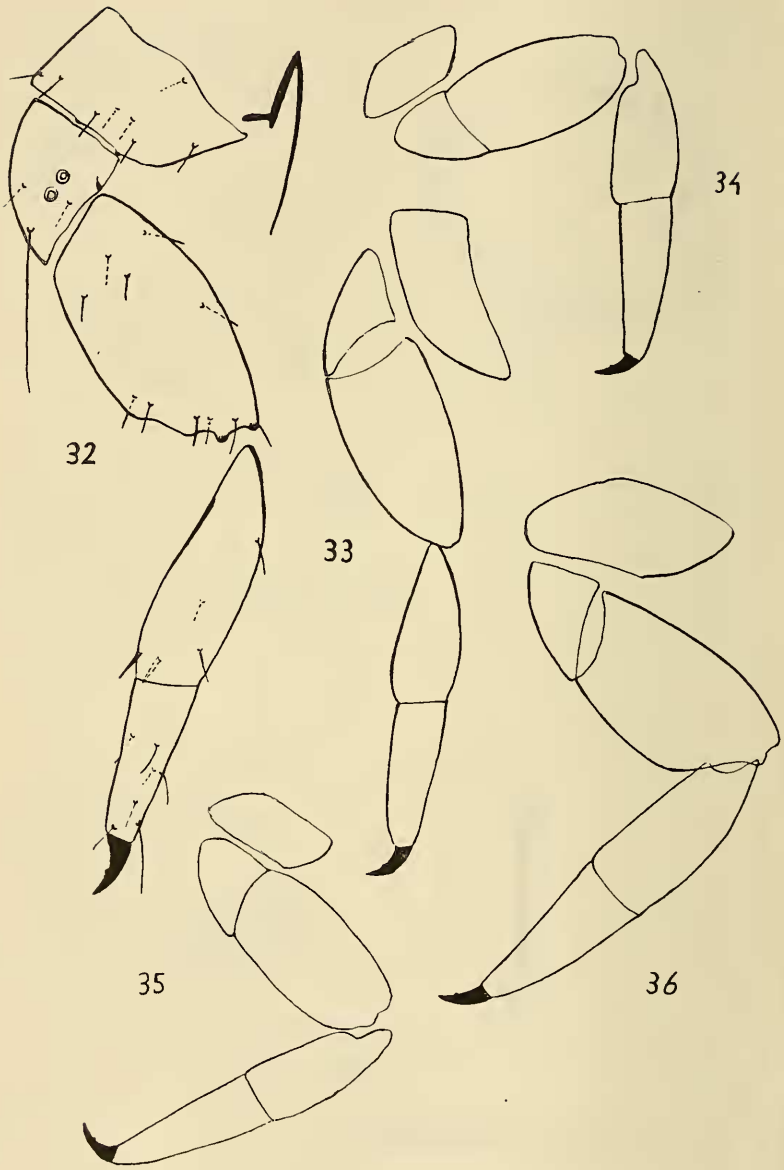
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